

# CUSTOMER REFERENCE

**SENIS**  
magnetic & current measurement

SENIS AG, Switzerland develops, manufactures and supplies advanced sensors and instruments for magnetic field and electric current measurement as well as the corresponding development and engineering services. Our solutions and services help our clients in the automotive, consumer electronics, test and measurement industries, as well as to research institutes to create powerful, robust and effective products.

SENIS® H3A Transducer used at NSRRC is a SENIS 3-axis ultra-low-noise and high-resolution magnetic flux density-to-analog voltage transducer with a hybrid 3-axis Hall probe of type S. The hybrid Hall probe integrates three high resolution Hall sensors, and a temperature sensor. The probe provides a good angular accuracy of the three measurement axes. The Hall probe is connected with an electronic box providing biasing for the Hall probe and the application of the improved **spinning-current technique**, which very effectively cancels offset, low frequency noise and the planar Hall effect. The additional conditioning of the Hall probe output signals in the electronic box includes Hall signal amplification, high linearization, compensation of the temperature variations, and limitation of the f-bandwidth.

[www.senis.ch](http://www.senis.ch)



國家同步輻射研究中心  
National Synchrotron Radiation Research Center

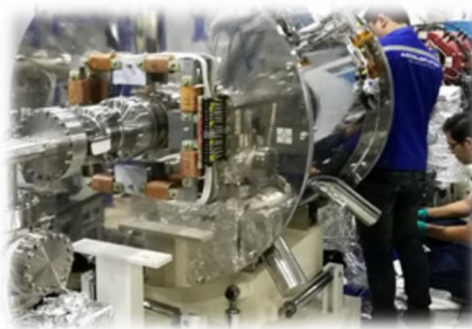


TABLE I  
POSITIONS AND ANGULAR ACCURACY MEASUREMENT RESULTS

Dimensions and positions accuracy	X (mm)	Y (mm)	Z (mm)
Position of the center (SENIS)	$-0.5 \pm 0.05$	—	$2.0 \pm 0.1$
Position of the center (measurement)	0.47	—	2.03
External dimensions of the probe (SENIS)	$8.0 \pm 0.1$	$0.9 + 0.05$	$4.0 + 0.05$
External dimensions of the probe (measurement)	8.01	0.91	4.0
	SENIS specifications	Measurement results	
Angular accuracy of axes with respect to the reference surface	$< \pm 0.5^\circ$	$\sim 0.1^\circ$	
Planar Hall coefficient	$< 0.01\%$	$\sim 0.007\%$	
	SENIS specification	Measurement results X channel	Measurement results Y channel
Offset voltage without chamber	$< \pm 10$ mV	3.57 mV	0.49 mV
Offset voltage with zero gauss chamber	—	3.26 mV	0.25 mV
Offset voltage with vacuum chamber	—	3.65 mV	0.55 mV

National Synchrotron Radiation Research Center ([www.nsrcc.org.tw](http://www.nsrcc.org.tw)), Taiwan utilizes SENIS I1A Magnetic Transducers to map magnetic field around permanent magnets. In their paper **A Hall Probe Calibration System at Low Temperature for the TPS Cryogenic Permanent Magnet Undulator**, NSRRC writes: "In Table I the needle magnet measurement results of the Hall probe (axis definitions shown in Fig. 2) and the specifications as given by the vendor (SENIS) are compiled. These measurement results indicate that an error of 30  $\mu$ m in the distance to the ceramic plate center in the x and z axes are within specifications... The angular accuracy of the Hall sensor with respect to the reference surface is checked by rotating the probe. The probe was first leveled by an automatic level and then rotated to find the angle for the maximum field. As verified by measurements the angle accuracy is about 2 mrad which will cause only a 1.5 ppm field error..."